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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/080,525	SHEKTER, JONATHAN	
	Examiner	Art Unit	
	Peter-Anthony Pappas	2671	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 21 February 2002.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-45 is/are pending in the application.

4a) Of the above claim(s) 22-25 and 42-45 is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-13,15-21,26-33,35-38,40 and 41 is/are rejected.

7)☒ Claim(s) 14,15,19,34 and 39 is/are objected to.

8)☒ Claim(s) 22-25 and 42-45 are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on 21 February 2002 is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

13)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.

4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: .

DETAILED ACTION

Election/Restrictions

Group I. Claims 1-21 and 26-41, drawn to a motion buffer, classified in class 345, subclass 419.

Group II. Claims 22-25 and 42-45, drawn to splitting 3-D objects into non-interacting object clusters, rendering all non-simple and non-interacting object clusters and compositing the non-simple and non-interacting object clusters to a 2-D scene and merging the contents of two separate motion buffers, classified in class 345, subclass 629.

1. Invention Groups I and II are related as subcombinations disclosed as usable together in a single combination. The subcombinations are distinct from each other if they are shown to be separately usable. In the instant case, invention: Group I has separate utility such that it comprises of a motion buffer, which can be used to store data for various properties of 3-D objects, transformations execution (i.e. anti-aliasing and depth-of-field blur through the rate of change of depth and surface geometry information) and receiving a motion buffer, all without the need for subsequent processing, as recited in Group II; Group II has separate utility such that it comprises of splitting of 3-D objects into non-interacting object clusters, rendering all non-simple and non-interacting object clusters to a motion buffer, compositing the non-simple and non-interacting object clusters to a 2-D scene and merging the contents of two separate motion buffers, all of which can be accomplished through use any motion buffering technique, in addition to that recited in Group I. See MPEP § 806.05(d).

2. Because these inventions are distinct for the reasons given above and the search required for: Group I is not required for Group II and Group II is not required for Group III, restriction for examination purposes as indicated is proper.

3. Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

4. During a telephone conversation with to John F. Horvath on 11/24/03 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-21 and 26-41. Affirmation of this election must be made by applicant in replying to this Office action. Claims 22-25 and 42-45 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Specification

5. Claim 15 is objected to because of the following informalities: Grammer. Text should read "...buffer further comprises using the surface geometry..." and not "...buffer further comprises using the the surface geometry..." Appropriate correction is required.

Allowable Subject Matter

6. Claims 14, 19, 34 and 39 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

7. In regards to claims 14 and 34 the prior art does not anticipate or suggest a system comprising the limitation of using depth and surface geometry information for

the one or more 3-D objects to extend, on an output buffer pixel basis, the surfaces of the one or more 3-D objects into an extended output buffer pixel, in combination with the other claim limitations, respectively.

8. In regards to claims 19 and 39 the prior art does not anticipate or suggest a system comprising the limitation of determining the number and volume of each uniquely layered space-time region, wherein the volume of a uniquely layered space-time region is calculated for the portion of the output buffer pixel and the portion of the shutter interval occupied by the space-time region, in combination with the other claim limitations, respectively.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 1-12, 16-18, 26-32, 35-38 and 40-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin (Patent No. 5, 990, 904), in view of Pearce et al. (Patent No. 5, 809, 219).

11. In regards to claim 1:

(a) A motion buffer, implemented on a machine readable medium, comprising a data structure configured to store on a per pixel basis the local properties of one or more 3-D objects to be composited to a 2-D scene including each 3-D object's color, depth,

12. Griffin discloses:

- One specific implementation of the invention includes a rasterizer, a pixel engine, a pixel buffer and a fragment buffer. The pixel buffer comprises an array of elements corresponding to pixel locations, and each element stores color and depth data for fully covered pixels closes to the viewpoint. The fragment buffer stores color, depth stores color, depth and coverage data for partially covered pixels. See column 5, lines 14-24.

(b) coverage,

13. Griffin discloses:

- The system supports a wide range of interactive applications. Its ability to support advanced real time animation makes it well-suited for games, educational applications, and a host of interactive applications. See column 7, lines 1-4.

14. Griffin fails to explicitly disclose coverage, as defined in the Specification.

15. Pearce et al. discloses:

- In computer generated animation, on the other hand, a frame is typically generated by sampling an application model at an instant of time. Effectively, the sampling model simulates an instantaneous shutter on a video camera. This form of sampling is satisfactory with scenes of low and moderate action. However, unpleasant stroboscopic effects (e.g., jerkiness) are evident when rapidly moving objects are present. This results since computer generated animation lacks the real-world motion blur of a moving object. See column 1, lines 20-28.

- In the present invention, motion blur simulation for an exposure interval is provided by analyzing the movement of tessellated representations of surfaces relative to a stationary sampling point on a pixel. See column 1, lines 44-47.
- For example, consider FIG. 3 which illustrates the movement of a polygon 302 between the S_{open} (shutter open) and S_{closed} (shutter close) positions. During an intermediate period of time, polygon 302 covers pixel 310. An estimate of the time that polygon 302 covers pixel 310 can be provided by temporal sampling at one or more sampling points 312. For example, assume that ten samples are taken at sampling point 312 during the exposure interval. If three samples intersect polygon 302, then polygon 302 is estimated to have a 0.3 coverage factor of sampling point 312. Other polygons may similarly cover sampling point 312 and produce their own coverage factors. See column 4, lines 23-33.

16. It would have been well known to one skilled in the art, at the time of the applicant's invention, to use motion blurring in (video) games, in a manner in which to improve the quality of the animations in said (video) games. Griffin is directed to (video) games and it would have been well known to one skilled in the art, at the time of the applicant's invention, to use animation in (video) games. Pearce et al. discloses using a specific coverage technique, involving shutter exposure times, as an element of a motion blurring technique to improve the quality of animations. Thus, it would have been obvious to combine the motion blurring technique disclosed by Pearce et. al with animation, within a (video) game environment, so to allow for a better quality of animation to be presented.

(c) transfer mode,

17. It is noted that the applicant discloses that transfer mode is also known as blend mode. See Specification, page 6 paragraph 4. Blending consists of color transformations, where various colors can be combined via various means, and consists of such properties as opacity and translucency. Thus, the expectations of the claim are still met.

18. Griffin discloses:

- Gsprites can be of arbitrary size and shape. In one implementation, we use rectangular gsprites. Pixels in the gsprite have color and alpha (opacity) information associated with them. See column 7, lines 63-67.
- As described above, the scan convert block (rasterizer) in the tiler generates instances of pixel data representing: 1) fully covered, opaque pixels; 2) fully covered translucent pixels; 3) partially covered, opaque pixels; or 4) partially covered, translucent pixels. See column 35, lines 48-52.

(d) and one or more of each 3-D object's surface geometry information.

19. Griffin discloses:

- As is shown in the flowchart in FIGS. 15A and 15B, the setup block processes primitive rendering instructions read from the shared memory. The vertex input processor parses the input stream (914) (FIG. 15A), and stores the information necessary for primitive triangle processing in the vertex control registers (916). The two vertex control registers store six vertices, three for each triangle in each register. The two vertex control registers allow for double buffering of triangle

information to assure that the setup engine always has triangle information to process. See column 31, lines 8-18.

- The rasterizer receives geometric primitives and generates instances of pixel data, including color, depth and coverage data. See column 5, lines 15-17.

20. It is noted that from depth and coverage calculations, resulting in the creation of depth and coverage data, for various surface elements, for a given geometric primitive, are used to establish this data. Said various surface elements include the primitive itself, represented as a whole, the primitive as represented by various polygons and/or the primitive as represented by pixels (per-pixel basis).

21. In regards to claim 2:

The motion buffer of claim 1, wherein the surface geometry information for each of the one or more 3-D objects stored in the motion buffer includes per pixel information about the local orientation of the surface of each of the one or more 3-D objects.

22. The rationale disclosed in the rejection of limitation (a) of claim 1 is incorporated herein.

23. It is noted that per-pixel information about the orientation of the surface of a 3-D object is defined by its per-pixel depth data relative to the per-pixel depth data associated with the same (3-D object) surface and/or additional (3-D object's) surface(s).

24. In regards to claim 3:

The motion buffer of claim 1, wherein the data structure is further configured to store the local properties of one or more 3-D objects in depth sorted order.

25. Griffin discloses:

- The pixel engine performs a depth compare operation on newly generated pixel data. If a generated pixel is occluded by the pixel in the pixel buffer, it is discarded. If the generated pixel is a fully covered pixel and is not occluded by the pixel in the pixel buffer, it replaces the pixel in the pixel buffer. See column 5, lines 26-31.

26. In regards to claim 4:

The motion buffer of claim 1, wherein the data structure is configured to store the local properties of the one or more 3-D objects as a plurality of linked links, wherein each linked list corresponds to a pixel in the 2-D scene, and each link in a linked list stores the local properties of one of the one or more 3-D objects.

27. Griffin discloses:

- The memory management of the fragment buffer is performed using a linked list structure. See column 34, lines 44-46.
- The fragment buffer is used to store information about pixel fragments for polygons whose edges cross a given pixel or for polygons with translucency. Each entry in the fragment buffer provides color, α , Z and coverage data associated with the surface. Multiple fragment buffer entries can be associated

with a single pixel (via a linked list mechanism) for cases in which multiple polygons have partial coverage for the same pixel location. See column 34, lines 33-41.

28. In regards to claim 5:

The motion buffer of claim 4, wherein each link in a linked list comprises a pixel fragment configured to store the local color, depth, coverage and transfer mode of one of the one or more 3-D objects, and one or more of that 3-D object's rate of change of depth and surface geometry information.

- The rationale disclosed in the rejection of claim 4 is incorporated herein.

29. In regards to claim 6:

(a) receiving one or more 3-D objects, wherein each 3-D object comprises one or more object primitives;

30. Griffin discloses:

- The surface elements, in this case polygons, are referred to as geometric primitives. See column 1, lines 61-63.
- In the context of 3-D graphics, the rendering process includes transforming the graphical models in a scene, and rasterizing the geometric primitives in the models to generate pixel data. See column 2, lines 1-4.

(b) scan-converting each 3-D object's one or more object primitives into a plurality of pixel fragments corresponding to a plurality of pixels in a 2-D scene, wherein each pixel fragment is configured to store the local properties of a scan converted object primitive including the object

primitive's local color, depth, coverage, and transfer mode, and one or more of the object's primitive's local rate of change of depth, and surface geometry information; and

- The rationale disclosed in the rejection of claim 1 is incorporated herein.

31. Griffin discloses:

- See Fig. 9A, specifically 394 (396, 398), 406, 410 and 408.

(c) inserting each of the pixel fragments into the motion buffer.

- The rationale disclosed in the rejection of claim 4 is incorporated herein.

32. In regards to claim 7:

The method of claim 6, further comprising inserting each of the pixel fragments into the motion buffer in depth sorted order.

- The rationale disclosed in the rejection of claim 3 is incorporated herein.

33. In regards to claim 8:

The method of claim 6, further comprising storing the motion buffer as a plurality of linked lists corresponding to a plurality of pixels in the 2-D scene, wherein each link in a linked list comprises a pixel fragment having a pointer to the next pixel fragment, if any, in the linked list.

34. Griffin discloses:

- Each fragment buffer entry includes the following data: R, G, B, α , Z, M, P, S. P is a pointer to the next fragment buffer entry. See column 34, lines 47-63.

35. In regards to claim 9:

(a) receiving a motion buffer, the motion buffer containing the rendered local properties of the one or more 3-D objects including each 3-D object's color depth, coverage, transfer mode, and one or more of each 3-D object's rate of change of depth and surface geometry information; and

36. Griffin discloses:

- The rationale disclosed in the rejection of limitations (a)-(e) of claim 1 are incorporated herein.
- See Fig. 4A, specifically 200, 204 and 210.

37. It is noted that elements of said motion buffer, previously disclosed in this Office Action, are illustrated as being received in step 210 of Fig. 4A by the Alpha and Color Buffers.

(b) resolving the motion buffer to composite the one or more 3-D objects to the 2-D scene.

38. Griffin discloses:

- See Fig. 2, specifically 144 and 142
- In the rendering process, the geometric primitives corresponding to objects in a scene are processed to generate a display image. In the context of 3-D graphics, the rendering process includes transforming the graphical models in a scene, and rasterizing the geometric primitives in the models to generate pixel data. See column 1, lines 66-7, and column 2, lines 1-4.
- The display device 142 is a color display, with continuous refresh to display an image. The display device in one embodiment is a cathode ray tube (CRT)

device, but it can also be a liquid crystal display (LCD) device, or some other form of display device.

39. It is noted that from steps 132 to 142 of Fig. 2 the various elements of said motion buffer are resolved. In addition it is noted that "pixel data" is 2-D data and that at the time of the applicant's invention said CRT and/or LCD display devices were used to display said 2-D data.

40. In regards to claim 10:

The method of claim 9, wherein the step of resolving the motion buffer to composite the one or more 3-D objects to the 2-D scene further comprises blending on a per-pixel basis and in depth sorted order, the color of each of the one or more 3-D objects to the color in the 2-D scene using the transfer mode of each of the one or more 3-D objects.

41. Griffin discloses:

- The scan convert engine 398 scan converts polygons, which in this case are triangles. The scan convert block 394 includes the interpolators for walking edges and evaluating colors, depths, etc. The pixel address along with color and depth, and anti-aliasing coverage information is passed to the pixel engine for processing. See column 18, lines 42-47.
- The scan convert engine 398 transfers pixel data to the pixel engine 406. The pixel engine 406 performs pixel level calculations including blending, and depth buffering. The pixel engine also handles Z-comparison operations required for

shadows. To achieve optimal performance, the pixel engine should preferably operate at one pixel per clock cycle. See column 19, lines 14-20.

42. It is noted that the use Z-comparison operations result in sorting biased by the depth (Z) value. In addition, it is noted, that shadows are an effect of blending.

43. In regards to claim 11:

The method of claim 9, wherein the motion buffer contains surface geometry information for each of the one or more 3-D objects and the step of resolving the motion buffer further comprises using the surface geometry information to simultaneously anti-alias the one or more 3-D objects while compositing the one or more 3-D objects to the 2-D scene.

44. Griffin discloses:

- The pixel engine 466 performs hidden surface removal using depth values generated by the rasterizer and also maintains pixel fragments and translucent pixels for anti-aliasing and translucency processing. For a given pixel location, the pixel engine retains the nearest fully covered opaque pixel, if any. In this context, "fully covered" means that the pixel is entirely covered by a polygon that is being scan converted in the rasterizer. After the pixel engine generates pixel data, the anti-aliasing engine 468 resolves the pixel data in the pixel and fragment buffers. See column 30, lines 16-32.

45. In regards to claim 12:

The method of claim 11, wherein two or more of the 3-D objects intersect over an output buffer pixel in the 2-D scene, further comprising:

(a) determining the number of regions in the output buffer pixel in which the one or more intersecting 3-D objects are uniquely layered, and the relative coverage of each uniquely layered region;

- The rationale disclosed in the rejection of claim 4 is incorporated herein.

46. Griffin discloses:

- After transforming the objects, the geometric primitives for the objects are "rasterized" or "scan converted." Rasterizing refers generally to the process of computing a pixel value for a pixel in the image being rendered based on data from the geometric primitives that project onto or "cover" the pixel. See column 2, lines 39-44.

(b) determining a blended color for each uniquely layered region by blending in depth sorted order the color of each of the one or more 3-D objects with the color of the output buffer pixel according to each 3-D object's transfer mode; and

47. Griffin discloses:

- Fragment resolution is the process during which all of the fragments for a pixel are combined to compute a single color and alpha value. This single color and alpha are written into the color buffer. See column 41, lines 53-66.

(c) painting the output buffer pixel with a weighted average of the blended colors determined for each uniquely layered region, wherein the weight assigned to the blended color of a uniquely layered region is determined by the relative coverage of that region.

48. Griffin discloses:

- Computing the resolved color includes accumulating a correctly scaled color contribution from each layer while computing and maintaining coverage information with which to scale subsequent layers. See column 42, lines 1-4.

49. Griffin fails to disclose a weighted average of the blended colors.

50. Pearce et al. discloses:

- In the example of FIG. 2, pixel 200 includes three separate regions 220, 230, 240. Each of regions 220, 230, 240 can represent at least part of a separate and distinct polygon, where each polygon has a separate color (e.g., red, green, and blue, respectively). To determine the color value of pixel 200, a weighted or unweighted average of the color values of each of pixel sampling points 211-219 (and possibly including sample points from neighboring pixels) is determined. See column 3, lines 60-67, and column 4, lines 1-2.

51. It would have been well known to one skilled in the art, at the time of the applicant's invention, to use motion blurring in (video) games, in a manner in which to improve the quality of the animations in said (video) games. Griffin is directed to (video) games and it would have been well known to one skilled in the art, at the time of the applicant's invention, to use animation in (video) games. Pearce et al. discloses using a specific coverage technique, utilizing weighted or unweighted average of the color values of each of pixel sampling points, as an element of a motion blurring technique to improve the quality of animations. Thus, it would have been obvious to combine the

motion blurring technique disclosed by Pearce et. al with animation, within a (video) game environment, so to allow for a better quality of animation to be presented.

52. In regards to claim 16:

The method of claim 9, wherein the motion buffer contains the rate of change of depth for each of the one or more 3-D objects, and the step of resolving the motion buffer further comprises using the rate of change of depth for each one or more 3-D objects to simultaneously motion-blur the one or more 3-D objects while compositing the one or more 3-D objects to the 2-D scene.

- The rationale disclosed in the rejection of limitation (b) of claim 1 is incorporated herein.

53. In regards to claim 17:

The method of claim 16, wherein the surfaces of two or more of the 3-D objects pass through each other over an output buffer pixel in the 2-D scene during a shutter interval, further comprising:

(a) determining the number of time periods during the shutter interval in which the one or more 3-D objects are uniquely layered, and the duration if each uniquely layered time period;

54. Griffin fails to explicitly disclose determining the number of time periods during the shutter interval in which the one or more 3-D objects are uniquely layered, and the duration if each uniquely layered time period;

55. Pearce et al. discloses:

- In contrast to this method, the present invention determines the interval of time that polygon 302 contains sampling point 312 by identifying the points in the time domain that the sampling point 312 is inside or touches the edges of polygon 302. See column 4, lines 44-49.

  (b) determining a blended color for each uniquely layered time period by blending in depth sorted order the color of each of the one or more 3-D objects with the color of the output buffer pixel according to each of the one or more 3-D objects' transfer modes; and

- The rationale disclosed in the rejection of claim 10 is incorporated herein.

  (c) painting the output buffer pixel with a weighted average of the blended colors for each uniquely layered time period, wherein the weight assigned to the blended color of a uniquely layered time period is determined by the duration of that time period.

- The rationale disclosed in the rejection of limitation (c) of claim 12 is incorporated herein.

56. In regards to claim 18:

The method of claim 9, wherein the motion buffer contains the rate of change of depth and surface geometry information for the one or more 3-D objects, and the step of resolving the motion buffer further comprises using the rate of change of depth and surface geometry information for the one or more 3-D objects to simultaneously anti-alias and motion-bur the

one or more 3-D objects while compositing the one or more 3-D objects to the 2-D scene.

- The rationale disclosed in the rejection of limitation (b) of claim 1 and the rejection of claim 15 are incorporated herein.

57. Griffin discloses:

- The pixel address along with color and depth, and anti-aliasing coverage information is passed to the pixel engine for processing. See column 18, lines 42-47.

58. In regards to claim 26:

A computer program product, implemented on a machine readable medium, for creating a motion buffer to store the local properties of one or more 3-D objects, the computer program product comprising instructions operable to cause a programmable processor to:

59. Griffin discloses:

- The graphics support software 160 can include functions to support memory management, view volume culling, depth sorting, chunking, as well as gsprite allocation, transformation, and level of detail. The graphics support software can include a library of graphics functions, accessible by graphics applications, to perform the functions enumerated here. See column 12, lines 11-16.

60. It would have been well known and obvious to one skilled in the art, at the time of the applicant's invention, to use software for the implementation of a motion buffer so to not limit the use and/or execution of said motion buffer to a single hardware platform.

61. The rationale disclosed in the rejection of limitations (a)-(c) of claim 6 are incorporated herein.

62. In regards to claim 27 the rationale disclosed in the rejection of claim 7 is incorporated herein.

63. In regards to claim 28 the rationale disclosed in the rejection of claim 8 is incorporated herein.

64. In regards to claim 29:

A computer program product, implemented on a machine readable medium, for compositing one or more 3-D objects to a 2-D scene, the computer program product comprising instructions operable to cause a programmable processor to:

65. The rationale disclosed in the rejection of limitations (a)-(b) of claim 9 are incorporated herein.

66. Griffin discloses:

- The graphics support software 160 can include functions to support memory management, view volume culling, depth sorting, chunking, as well as gsprite allocation, transformation, and level of detail. The graphics support software can include a library of graphics functions, accessible by graphics applications, to perform the functions enumerated here. See column 12, lines 11-16.

67. It would have been well known and obvious to one skilled in the art, at the time of the applicant's invention, to use software for the implementation and execution of a

motion buffer so to not limit the use and/or execution of said motion buffer to a single hardware platform.

68. In regards to claim 30 the rationale disclosed in the rejection of claim 10 is incorporated herein.

69. In regards to claim 31 the rationale disclosed in the rejection of claim 11 is incorporated herein.

70. In regards to claim 32 the rationale disclosed in the rejection of limitations (a)-(c) of claim 12 are incorporated herein.

71. In regards to claim 33 the rationale disclosed in the rejection of claim 13 is incorporated herein.

72. In regards to claim 35 the rationale disclosed in the rejection of claim 15 is incorporated herein.

73. In regards to claim 36 the rationale disclosed in the rejection of claim 16 is incorporated herein.

74. In regards to claim 37 the rationale disclosed in the rejection of limitations (a)-(c) of claim 17 are incorporated herein.

75. In regards to claim 38 the rationale disclosed in the rejection of claim 18 is incorporated herein.

76. In regards to claim 40 the rationale disclosed in the rejection of claim 20 is incorporated herein.

77. In regards to claim 41 the rationale disclosed in the rejection of claim 21 is incorporated herein.

78. Claims 13, 15, 20-21 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Griffin (Patent No. 5, 990, 904), in view of Pearce et al. (Patent No. 5, 809, 219), as applied to claims 1-12, 16-18, 26-32, 35-38 and 40-41, and further in view of Deering (Patent No. 6, 426,755).

79. In regards to claim 13:

The method of claim 9, wherein the motion buffer contains surface geometry information for the one or more 3-D objects and the step of resolving the motion buffer further comprises simultaneously depth-of-field blurring the one or more 3-D objects while compositing the one or more 3-D objects to the 2-D scene.

80. Griffin and Pearce et al. fail to explicitly disclose where the step of resolving the motion buffer further comprises simultaneously depth-of-field blurring the one or more 3-D objects.

81. Deering discloses:

- Since these effects (i.e. depth of field blur and transparency) tend to be highly dependent upon viewpoint location, the lack of hardware capable of performing these effects in real time prevents applications such as 3D games and simulators from taking full advantage of these effects. Thus a graphics system capable of performing motion blur, depth of field, and/or transparency effects in real time is needed. The present invention contemplates the use of a "super-sampled" graphics system that selectively renders samples into a sample buffer, and then filters the samples in realtime to form output pixels. Advantageously, this

configuration allows the graphics system to generate high quality images and to selectively apply one or more of the effects described above (e.g., motion blur, depth of field, and screen door-type transparency) in real time. See column 3, lines 13-30.

82. It would have been well known to one skilled in the art, at the time of the applicant's invention, to use the depth of field blur technique in (video) games, in manner in which to improve the quality of the realism in said (video) games. Deering discloses the use of a depth of field blur technique in manner in which to allow for its use in real-time, so to improve the quality of realism in applications such as (video) games. Griffin is directed to (video) games and it would have been well known to one skilled in the art, at the time of the applicant's invention, to use animation in (video) games. Thus, it would have been obvious to combine depth of field blur with animation, used in a (video) game environment, so to allow for a better quality of animation to be presented.

83. In regards to claim 15:

The method of claim 9, wherein the motion buffer contains the surface geometry information for the one or more 3-D objects and the step of resolving the motion buffer further comprises using the surface geometry information to simultaneously anti-alias and depth-of-field blur the one or more 3-D objects while compositing the one or more 3-D objects to the 2-D scene.

- The rationale disclosed in the rejection of claim 13 is incorporated herein.

84. Griffin discloses:

- The pixel address along with color and depth, and anti-aliasing coverage information is passed to the pixel engine for processing. See column 18, lines 42-47.

85. In regards to claim 20:

The method of claim 9, wherein the motion buffer contains the rate of change of depth and surface geometry information for the one or more 3-D objects, and the step of resolving the motion buffer further comprises using the rate of change of depth and surface geometry information for one or more 3-D objects to simultaneously motion-blur and depth-of-field blur the one or more 3-D objects while compositing the one or more 3-D objects to the 2-D scene.

- The rationale disclosed in the rejection of claims 13 and 16 are incorporated herein.

86. In regards to claim 21:

The method of claim 9, wherein the motion buffer contains the rate of change of depth and surface geometry information for the one or more 3-D objects, and the step of resolving the motion buffer further comprises using the rate of change of depth and the surface geometry information for one or more 3-D objects to simultaneously anti-alias, motion-blur and depth-of-field blur the one or more 3-D objects while composting the one or more 3-D objects to the 2-D scene.

- The rationale disclosed in the rejection of claims 15 and 16 are incorporated herein.

87. In regards to claim 33 the rationale disclosed in the rejection of claim 13 is incorporated herein.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure: "The A-buffer, an Antialiased Hidden Surface Method" (Computer Graphics, Vol. 18, No. 3, 1984) referred to as Carpenter. Carpenter discloses a software based anti-aliased, area-averaged, accumulation buffer in which two data types, representing pixel data, are defined: pixelstruct – used to store depth and a pointer or depth, color and coverage; fragment – used to store a pointer, color, opacity, area, an object tag, a pixel mask and a positive range of Z vales.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Peter-Anthony Pappas whose telephone number is 703-305-8984. The examiner can normally be reached on M-F 8:15am-5:45pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Zimmerman can be reached on 703-305-9798. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

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Examiner
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